Polio

CLINICAL CASE DEFINITION

Acute onset of a flaccid paralysis of one or more limbs with decreased or absent tendon reflexes in the affected limbs, without other apparent cause, and without sensory or cognitive loss.

Note: Polio has been eliminated from the US and western hemisphere; the last US cases of indigenous, wild poliovirus-associated disease were in 1979, and the last case in the Americas was detected in Peru in 1991. An active global eradication program is in progress. The potential for importation of wild poliovirus into the United States remains until worldwide poliomyelitis eradication is achieved. In recent years polio has remained endemic in just four countries (Afghanistan, Nigeria, Pakistan, and India), although there have been numerous instances of spread to polio-nonendemic countries, mainly on the African continent. Rare instances of vaccine-associated paralytic poliomyelitis can occur in countries using live-attenuated oral polio vaccines (OPV); the US discontinued use of OPV in 2000, replaced by inactivated polio vaccine (IPV) for all scheduled doses.

Most poliovirus infections are asymptomatic or cause mild febrile disease. Poliovirus infections occasionally cause aseptic meningitis and up to one out of 200 infections from poliovirus type 1 results in paralytic poliomyelitis, characterized by acute onset of flaccid paralysis that is typically asymmetric and associated with a prodromal fever. Poliovirus is spread through fecal material, oral secretions, some aerosols and fomites.

CASE CLASSIFICATION

Probable: A case that meets the clinical case definition.

Confirmed: A case that meets the clinical case definition **and** in which the patient has a neurologic deficit 60 days after onset of initial symptoms, has died, or has unknown follow-up status.

Comment: All suspected cases of paralytic poliomyelitis are reviewed by a CDC panel of expert consultants before final classification occurs. Confirmed cases are then further classified based on epidemiologic and laboratory criteria. Only confirmed cases are included in Table 1 in the MMWR. Suspected cases under investigation are enumerated in a footnote to the MMWR table.

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TRANSMISSION

Person to person spread, principally through fecal-oral route. Respiratory spread is also possible.

INCUBATION PERIOD

The incubation period for poliomyelitis is commonly 6 to 20 days with a range of 3 to 35 days. See Polio timeline, below.

PERIOD OF COMMUNICABILITY

Not precisely defined; presumably as long as virus is being excreted; may begin 1-2 days before clinical onset.

REPORTING/INVESTIGATION

Health care providers should immediately report suspect cases of polio to the local health department serving the residence of the case. Because poliomyelitis has been eliminated from

the western hemisphere and is the target of global eradication, any suspected case of poliomyelitis should be investigated immediately by local and state health departments in close collaboration with CDC.

Local health department responsibilities:

- Contact case/guardian and health care provider.
- Determine if case meets clinical case definition.
- **Note:** Guillain-Barré syndrome (GBS) is the most common disease that also causes acute flaccid paralysis. However, it is usually symmetrical (unlike poliomyelitis) and progresses in an ascending fashion from the lower limbs and for a longer period (up to 10d).
- If definition met (probable or confirmed cases), investigate using SUSPECTED POLIO CASE WORKSHEET and control guidelines below.
- Notify MDHHS Immunization Division Vaccine-Preventable Disease (VPD) Surveillance Coordinator at 517-335-8159 (after hours 517-335-9030). MDHHS personnel will consult with CDC regarding the collection of appropriate clinical specimens for viral isolation and serology, the initiation of appropriate consultations and procedures to rule out or confirm poliomyelitis, the compilation of medical records, and most importantly, the evaluation of the likelihood that the disease may be caused by wild poliovirus. In the event that contact with CDC must be made directly, call the National Center for Immunization and Respiratory Diseases at 404-639-8257 or the CDC after-hours line at 770-488-7100 or 404-639-2888 or 404-639-2889.
- Assist with coordination of specimen collection and coordination if public health lab resources (MDHHS, CDC, etc) are used.
- Report/ensure reporting of case to the Michigan Disease Surveillance System (MDSS). Obtain immunization history information from provider record or MI Care Improvement Registry (MCIR - state immunization registry).
- Update the MDSS record in a timely manner with new or additional info as it becomes available. Finalize MDSS record when case investigation is complete.
- In the event of death, obtain and send copies of hospital discharge summary, death certificate, and autopsy report to MDHHS Immunization Division.

LABORATORY CONFIRMATION

- Virology

Laboratory studies, especially attempted poliovirus isolation, are critical to rule out or confirm the diagnosis of paralytic poliomyelitis. Viral isolates should be sent to CDC for intratypic differentiation to determine whether the poliovirus isolate is wild or vaccine-related (for more information, see Laboratory Procedures and Considerations, below).

Note: Isolation of wild poliovirus constitutes a public health emergency and appropriate control efforts must be initiated immediately (in consultation between health care providers, the state and local health departments, and CDC).

- Serology

Serology may be helpful in supporting or ruling out the diagnosis of paralytic poliomyelitis. An

acute serum specimen should be obtained as early in the course of disease as possible, and a convalescent specimen should be obtained 3 weeks later.

See LABORATORY SPECIMENS: PROCEDURES AND CONSIDERATIONS, below, for additional information.

IMMUNITY/SUSCEPTIBILITY

- Susceptibility is universal
- Natural infection confers immunity, specific to the poliovirus type causing the infection
- Immunization with polio vaccine series is highly effective in producing immunity
- In US, immunity among infants, children, adolescents and young adults is high due to long-standing immunization programs
- Members of certain religious or other groups objecting to vaccination have remained susceptible to poliomyelitis

CONTROL MEASURES

Control measures will be determined in consultation with CDC (Infant Immunization Activity, National Center for Immunization and Respiratory Diseases [NCIRD] 404-639-8255).

LABORATORY PROCEDURES AND CONSIDERATIONS

In the investigation of suspected poliomyelitis, laboratory specimens for confirmation are essential. In addition to the guidelines provided below, consult with MDHHS Immunization Division (517-335-9657) and if necessary, MDHHS Virology Laboratory (517-335-8099) and CDC Enterovirus Laboratory (404-639-2749).

POLIO SEROLOGY

- Purpose: to confirm a case of polio. By special request; advance arrangement required.
- Specimens needed: acute- and convalescent-phase sera, 2 ml each.
- MDHHS lab kit: unit 8
  - Specimen container: plastic serum tube with skirted cap
  - MDHHS lab form: DCH-0583 (formerly FB 200).
  - Specimen collection/submission procedure:
    - Collect at least 5 ml of whole blood in red-top or other tube without anticoagulant. Separate serum from blood by centrifugation and pour into PLASTIC serum tube, store at 2 - 8 C, or freeze serum if it cannot be shipped and received in MDHHS lab within 3 days. Do not freeze whole blood.
- Timing of sera specimen collection
    - Acute phase specimen: collect as soon after onset of paralysis as possible
    - Convalescent phase specimen: collect at least 3 weeks after acute specimen

  Test will be done when both specimens are received (specimens can be sent individually or acute can be held at 2 - 8 C and sent to lab with convalescent specimen). If the specimens are sent to MDHHS lab separately, be sure to indicated on the Lab Request form that this is an acute serum and that the convalescent specimen will follow in

approximately 10 -14 days.

- Label tube(s) with patient name, date of birth, and date of specimen collection.

- Complete MDHHS Virology Test Requisitions Form DCH-0583 (formerly FB 200); complete all information in the Patient Information and Specimen Information sections.

Test is by special request and arrangement only; advance notification and arrangement necessary through VPD Surveillance Coordinator (517-335-8159). Indicate "Polio serology" in "Other - specify test" section of form.

- Be sure MDHHS Immunization Division has been notified of the case investigation.
- Ship specimens on a cold pack by overnight delivery if possible.
- Mail specimens to:

Michigan Department of Health & Human Services
Bureau of Laboratories
3350 N. Martin Luther King Blvd.
Building 44, Room 155
Lansing, MI 48909

POLIO VIROLOGY

- Virology specimens

  At least two stool specimens and two throat swabs should be obtained 24 hours apart from patients with suspected poliomyelitis as early in the course of the disease as possible (i.e., immediately after poliomyelitis is considered as a possibility in the differential diagnosis), but ideally within the first 15 days after onset of paralytic disease.

- Purposes:
  To confirm a case of polio by providing virologic evidence of infection (isolation of virus in tissue culture)
  To determine which poliovirus type (serotyping for types 1, 2, or 3)
  To determine if an isolate is associated with wild- or vaccine-strain (intratypic differentiation using DNA/RNA hybridization or PCR).

These tests are by special request, performed either at MDHHS or CDC; advance arrangement required.

- Specimens needed:
  - 2 or more stool specimens
  - 2 or more throat swab specimens

- MDHHS lab kit: unit 8
  - Specimen container: plastic serum tube with skirted cap
  - MDHHS lab form: DCH-0583 (formerly FB 200).

Specimen collection/submission procedure:

- Collect at least 2 stool specimens and 2 throat swab specimens.
- Specimens should be obtained at least 24 hours apart as early in the course of illness as possible, ideally within 14 days of onset. Stool specimens collected >2 months after the onset of paralytic manifestations are unlikely to yield poliovirus. Throat swabs are less often positive than stool samples, and virus is rarely detected in CSF.

Note: In addition to specimens for virology lab testing, an acute-phase serologic specimen should be obtained as early in the course of illness as possible, and a convalescent-phase specimen should be obtained at least 3 weeks later (see **POLIO SEROLOGY**, above).

Mail specimens to: Michigan Department of Health and Human Services
Bureau of Laboratories DASH Unit
3350 N. Martin Luther King Blvd.
Building 44, Room 155
Lansing, MI 48909

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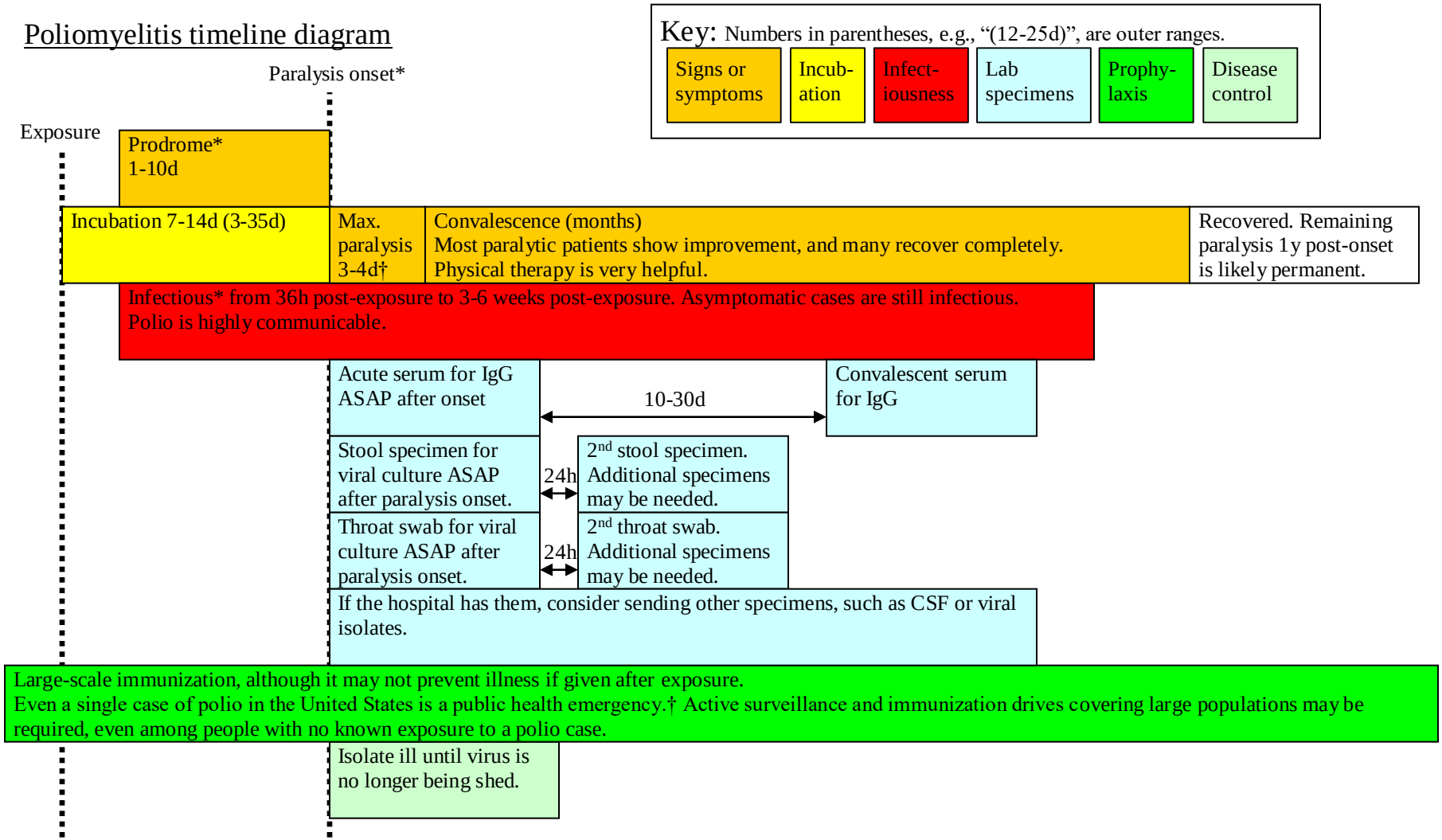
Poliomyelitis timeline diagram



* ~95% of pertussis cases are asymptomatic, making quarantine impractical; a few percent have nonspecific symptoms (e.g., fever, sore throat, GI upset; essentially, the prodrome only), with no paralysis. 1% to 2% suffer 2-10d of aseptic meningitis without paralysis, and <1% develop flaccid paralysis.

† Guillain-Barré syndrome is the most common disease that also causes acute flaccid paralysis. However, it is usually symmetrical (unlike poliomyelitis) and progresses for a longer period (up to 10d).

Sources: Control of Communicable Diseases Manual, Red Book, Pink Book, CDC VPD surveillance manual